

CLAIMS

1. A method of processing seaweed which comprises the following steps:

- 5 (i) treating seaweed with an alcohol having one to six carbon atoms to form an alcoholic fraction and an insoluble first seaweed residue;
- (ii) separating the alcoholic fraction;
- 10 (iii) removing the alcohol from the alcoholic fraction to form a concentrate comprising biologically active low molecular weight compounds;
- (iv) extracting the first seaweed residue with an aqueous solution at a pH of less than about 6 to form an aqueous first extract and an insoluble second seaweed residue;
- 15 (v) optionally concentrating the first extract; and
- (vi) adjusting the pH of the resulting concentrated extract to a value in the range of about 5 to about 8 to obtain a first polysaccharide fraction comprising a mixture of laminaran and fucoidan.
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2. A method as claimed in claim 1, further comprising treating the first polysaccharide fraction with ethanol to precipitate fucoidan and laminaran and separating the fucoidan and laminaran.

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3. A method as claimed in claim 1 or claim 2, further comprising: extracting the second seaweed residue with water at a temperature of 40 to 100°C to form an aqueous second extract and an insoluble third seaweed residue.

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4. A method as claimed in claim 3, further comprising: concentrating the second extract; and drying the concentrate to obtain a second polysaccharide fraction comprising a mixture of laminaran, fucoidan, and polymannuronic acid.
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5. A method as claimed in claim 4 further comprising acidifying the second polysaccharide fraction to a pH not higher than 2.5 to precipitate polymannuronic acid; and separating the polymannuronic acid.
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6. A method as claimed in claim 5, further comprising dissolving the precipitate in an alkaline solution and precipitating a salt of polymannuronic acid with ethanol.
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7. A method as claimed in claim 6, further comprising: neutralizing the supernatant after precipitation; and precipitating the neutralized supernatant with ethanol to form a second polysaccharide fraction comprising fucoidan and laminaran.
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8. A method as claimed in any one of claims 3 to 7, further comprising treating the third seaweed residue with an alkali to form a third extract.
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9. A method as claimed in claim 8, further comprising concentrating and neutralizing the third extract and precipitating with ethanol to obtain a third polysaccharide fraction comprising a salt of alginic acid.
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10. A method as claimed in any one of claims 1 to 9, wherein the seaweed is a brown seaweed.

11. A method as claimed in claim 10, wherein the seaweed is from a species selected from the group consisting of *Laminaria cichorioides*, *Laminaria japonica*, *Alaria marginata*, *Alaria fistulosa*,
5 *Fucus evanescens* and *Undaria pinnatifida*.
12. A method as claimed in any one of claims 1 to 11, wherein the seaweed is fresh or frozen.
- 10 13. A method as claimed in any one of claims 1 to 12, wherein in (i) the seaweed is treated with ethanol at a temperature of from about 40 to about 60°C.
14. A method as claimed in claim 1, wherein in (iv) the first seaweed
15 residue is extracted with hydrochloric acid at pH of about 0.5-3.0, preferably 0.5-1.5.
15. A method as claimed in any one of claims 3 to 7, wherein the second seaweed residue is extracted with water at pH of about 2.0-5.0,
20 preferably 3.5-4.0.
16. A method as claimed in any one of claims 1 to 15, wherein one or more of the extracts are sequentially concentrated by ultrafiltration on hollow fiber with pore size of 5-100 kDa.
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17. A method as claimed in claim 6, wherein a salt of polymannuronic acid is formed by treating the precipitate of polymannuronic acid with a solution of a salt selected from the group consisting of sodium hydroxide, ammonium oxalate, calcium hydroxide and magnesium
30 hydroxide.

18. The method as claimed in claim 9, wherein a salt of alginic acid is formed by treating the third seaweed residue with a salt selected from the group consisting of sodium hydroxide, sodium bicarbonate, ammonium oxalate, calcium hydroxide and magnesium hydroxide.
19. Product obtainable by the method of any one of claims 1 to 17.
20. A cosmetic or pharmaceutical composition, a food product, food supplement or a nutritional supplement comprising the product of claim 19 together with a diluent or carrier.
21. The use of a product of claim 19 in the cosmetic, pharmaceutical or food industry.